

BIOSYSTEMATIC STUDIES IN LEOPOLDIA PARL.

BY BENGT BENTZER

1973

BIOSYSTEMATIC STUDIES IN AEGEAN REPRESENTATIVES OF THE
GENUS LEOPOLDIA PARL. (LILIACEAE)

AV
BENGT BENTZER
FIL. LIC., HLD.

AKADEMISK AVHANDLING

som för avläggande av filosofie doktorsexamen vid Matematisk-
Naturvetenskapliga Fakulteten vid Universitetet i Lund kommer att
offentligen försvaras å föreläsningssalen vid Institutionen för Systematisk Botanik, måndagen den 28 maj 1973 klockan 10.00.

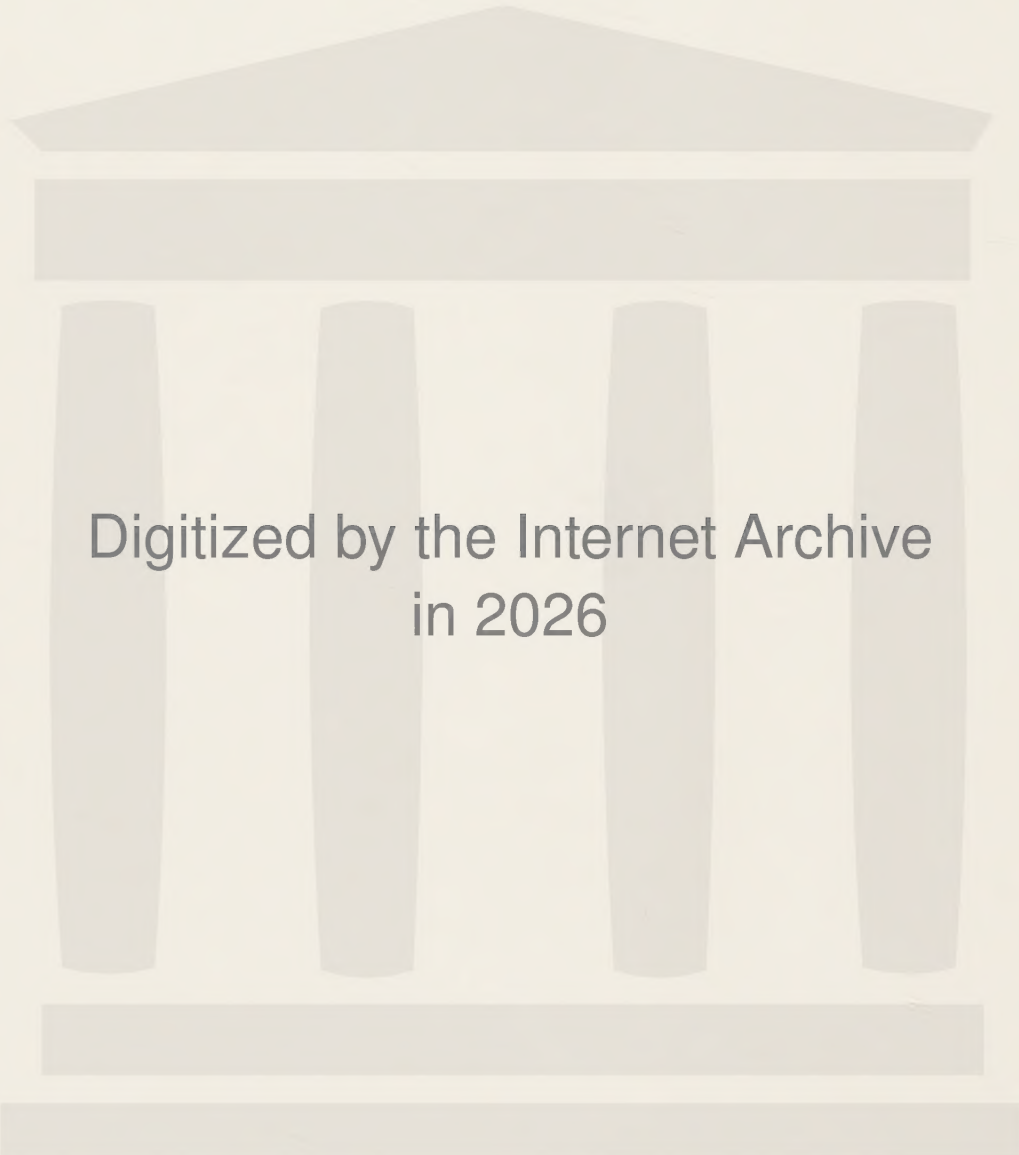
UNIVERSITY OF LEEDS LIBRARY

LEEDS, WEST YORKSHIRE



LEEDS, WEST YORKSHIRE

The University of Leeds Library
has acquired the following books
from the collection of the
University of Leeds Library
and the University of Leeds Library
has acquired the following books



Digitized by the Internet Archive
in 2026

Digitized by Google

Digitized by Google

https://archive.org/details/IA41545309_0038

The present thesis is based upon the following papers:

- Bentzer, B. 1972 a. Structural chromosome polymorphism in diploid *Leopoldia weissii* (Freyn) Freyn ex Heldr. (Liliaceae). -- Bot. Notiser 125: 180 - 185.
- 1972 b. Variation in the chromosome complement of *Leopoldia comosa* (L.) Parl. (Liliaceae) in the Aegean (Greece). -- Ibid. 125: 406 - 418.
- 1973 a. Taxonomy, variation and evolution in representatives of *Leopoldia* Parl. (Liliaceae) in the southern and central Aegean. -- Ibid. 126: 69 - 132.
- 1973 b. Karyotypes and meiosis in *Leopoldia* Parl. (Liliaceae) from the southern and central Aegean (Greece). -- Ibid. 126 (in manuscript).

AIMS

1. To study the morphological variation within and between different populations of *Leopoldia* in the Aegean.
2. To study the reproductive biology.
3. To study the cytological variation.
4. To elucidate possible modes of differentiation.
5. To propose a taxonomic subdivision of the genus in the southern and central Aegean.

MATERIAL

The study is based on observations and measurements made in the field and on borrowed herbarium material as well as on c. 1500 cultivated plants from c. 250 natural populations.

RECOGNIZED TAXA

Five species and two subspecies are recognized, viz. *Leopoldia comosa* (L.) Parl., $2n = 18$ (27), *L. weissii* (Freyn) Freyn ex Heldr., $2n = 18, 36$ (54), *L. cycladica* (Davis & Stuart) Garbari ssp. *cycladica*, $2n = 36, 54$, *L. cycladica* (Davis & Stuart) Garbari ssp. *subsessilis* Bentzer, ssp. nov., $2n = 36$, *L. dionysica* (Rech. fil.) Bentzer, comb. nov., $2n = 18, 36$, *L. spreitzenhoferi* Heldr., $2n = 18, 36$.

DISTRIBUTION OF TAXA

L. comosa is a weed more or less evenly distributed in the entire Mediterranean. L. weissii is mainly restricted to the Aegean archipelago but has a wide distribution there. L. cycladica ssp. cycladica is endemic to the central Aegean, i.e. the Kikladhes. L. cycladica ssp. subsessilis is found on a few islands in the Kikladhes and on SE Kriti. L. dionysica is found on small islands in the SE Aegean sea and in one locality in the Northern Sporades. Finally, L. spreitzenhoferi is endemic to Kriti with one dubious locality in Algeria.

REPRODUCTIVE BIOLOGY

All taxa seem to be amphimicts with an apparently varying degree of bulbil production. In L. spreitzenhoferi no proliferation at all was observed but the material was limited. Outbreeding seems to prevail in nature and partial self-incompatibility occurs. Pollen stainability was comparatively often reduced to below 90 %.

VARIATION

The intrapopulational variation was often as large as interpopulational variation in the taxa. Local differentiation was common and several more or less isolated populations particularly of L. dionysica and L. weissii are distinct in some character. In L. weissii there are two usually distinct ecotypes; one growing in phrygana and one in disturbed habitats.

CROSSES

In artificial crosses within taxa and within the same level of ploidy seed setting and seed germination were usually successful. Crosses between taxa but within the same level of ploidy were generally easy to achieve. L. comosa alone was difficult to cross both intraspecifically and interspecifically.

HYBRIDIZATION

Spontaneous hybrids between L. weissii (4x) and L. comosa (2x) were found in some localities. The hybrids were triploids with capacity for proliferation maintained in at least some cases.

KARYOTYPES

The karyotypes of the various taxa are trimodal with one group of very distinct long chromosomes upon which most attention has been focussed. L. comosa has a karyotype which is easily distinguishable from those of the other taxa which are in themselves basically similar. The satellites are very variable in size, number and position in all taxa.

STRUCTURAL HETEROZYGOSITY.

In L. comosa a case of a common and widespread rearrangement was found. The rearrangement is presumed to be due to a pericentric inversion which may occur heterozygotically, homozygotically or may be lacking within the same population. The total frequency of the presumed inversion is in close agreement with the expected Hardy-Weinberg distribution.

Certain plants of L. weissii, L. cycladica ssp. cycladica, L. cycladica ssp. subsessilis and L. dionysica have another type of presumed pericentric inversion in one (or more) of their long chromosomes. The presumed inversion is similar in several widely separated populations of the various taxa.

In L. weissii from the island of Rhinia two populations were found with plants having an additional segment in one of the long chromosomes.

A number of other cases of structural heterozygosity were found in mitotic as well as in meiotic preparations.

POLYPLOIDY

The polyploidy which occurs in all taxa is presumed to be of autopolyploid origin. It is suggested that polyploid populations have existed since Pliocene times when land connections existed between the islands and the mainlands of Greece and Anatolia.

EVOLUTION

Differentiation in the genus is presumed to be caused by a combination of factors, viz. drift, adaptive radiation, "founder effect" and occasional hybridization between species as well as between temporarily sympatric populations of the same taxon.

